SECONDARY-ROADS ADMINISTRATION

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SYNOPSIS

CAPE SPECIAL ROAD DISTRICT was organized November 23, 1912, by leading citizens of the City of Cape Girardeau who realized the necessity for secondary roads leading into the city. The district is approximately 12 mi. square surrounding the city. The population of the city is approximately 22,000 and of the county 39,000.

The governing body of the district is a board of three commissioners, each appointed for a 3-year term by joint action of the county court and the city council. The board has exclusive control of construction and maintenance of all non-state roads in the district and the authority to plant and cultivate ornamental and shade trees along the right-of-ways.

In 1946 the district acquired the vehicular-traffic bridge across the Mississippi River at Cape Girardeau and now continues the operation as a toll bridge with the view of making it toll free or at a reduced fare after the revenue bonds are retired. The purchase price was $2,370,000 and revenue bonds in that amount pledging toll revenue only were issued at that time. All bonds will likely be retired by 1958.

Maintenance and construction of roads and bridges are financed by a tax on all property within the district. The rate in 1950 was 35 cents per $100 of assessed valuation, which in 1950 amounted to $59,308 on an assessed valuation of $20,732,-333. Only 80 percent of the road and bridge tax funds is turned over to the district; 20 percent is retained by the county court for road and bridge work outside of the district.

Road mileage maintained by the district at present is 122.5 mi., all surfaced either gravel, oil mat, or portland-cement concrete. Construction and maintenance practices closely follow those in use by the state highway department. The district also maintains three parks for recreational use adjacent to a scenic drive north of the city From 1931 to 1939 the district assisted the state highway department in the planting and beautification of the right-of-way of US 61 for a distance of 10 mi. between Cape Girardeau and Jackson. Over 25,000 plantings of all kinds were set out and the project is now considered one of the most extensive roadside developments in the Midwest.

In addition to the development and improvement of the road net in the district, there has been furnished since 1926 a total of $86,391 to the state highway department to assist in purchasing right-of-ways through the county. Also, there has been expended throughout the years a total of $167,132 on projects within the city limits of Cape Girardeau and a total of $54,174 for road and bridge construction outside of the district boundaries.

● The County of Cape Girardeau, Missouri, was organized October 1, 1812. The City of Cape Girardeau was first settled in 1793, laid out as a town in 1805, and incorporated as a city in 1808.

In 1912 the Cape Special Road District, of Cape Girardeau County, was organized under what now appears to be Article 10, Chapter 46, of Laws of Missouri Relating to Roads, Highways and Bridges. Section 8673 of Article 10, Chapter 46, states, "Territory not exceeding eight miles square, wherein is located any city, town or village containing less than one hundred thousand inhabitants, may be organized as hereinafter set forth into a Special Road District: Provided, however, the provisions of this section shall not apply to counties under township organizations or Class 1 Counties".

On November 23, 1912, the Board of Commissioners of the Cape Special Road District met and organized by electing a chairman and clerk of the board. This was the beginning of a planned road program for the district.

The reason for the organization of the road district was to develop a system of secondary roads leading into the City of Cape Girardeau.

Special road districts have been organized

all over the State of Missouri and at present there are approximately 185 districts operating within the state.

In 1946 the commissioners of the Cape Special Road District acquired the traffic bridge across the Mississippi River at Cape Girardeau. This toll bridge had long been under the ownership of private capital and the commissioners had the vision of operating the toll bridge under public ownership and eventually making it toll free, or at a much reduced fare.

In 1949, property owners residing outside of the district boundaries petitioned the County Court to hold a special election submitting to the voters a proposal that the Road District boundaries be extended to the maximum as prescribed by Missouri Law. The special election was held, the proposal carried and the size of the District was increased to approximately 12 mi. square.

DESCRIPTION OF ROAD DISTRICT

Cape Special Road District, being approximately 12 mi. square, surrounds the City of Cape Girardeau. One district boundary is the Mississippi River on the east, Scott County, Missouri, borders on the south and State Route 25 is the boundary line on the west (see Figures 1 and 2).

The terrain of the district varies from hills on the north to flat lands on the south. Elevations vary from 740 to 338 ft., mean sea level. Generally the terrain of the district is rolling with many watercourses. Soil maps of the district indicate 15 types of soil. The upland part of the District is considered part of the Ozark Border, while the flat land of the southern portion is part of the great Mississippi embayment, which includes all of Southeast Missouri.

Land lines and property lines throughout the district are generally section or U. S. Survey lines.

The annual rainfall in Cape Girardeau is normally 44.35 in. The temperature ranges from a maximum of 100 F. to a low of approximately 25 deg. below zero, with an average annual temperature of 56 F. and humid.

According to the 1950 Census the population of the City of Cape Girardeau is 21,539 and the population of the county is 38,509. Vehicle registration of the city is 5,812 and of the county 10,834. Missouri state vehicle registration in 1948 was 1,193,415.

At present there are five rural postal routes and 18 school busses operating on roads throughout the district, and there are 11 rural schools in operation within the district boundaries.

The principal industry of the district is farming. There are 190 milk producers furnishing milk to dairies in the city. Within the city there is a large shoe factory, cement plant, quarry, three river terminals and oil-distributing depots and other industries.

At present the annual pay roll of the city is $18,500,000 and the value of the farm products raised in the county amounted to $6,717,932 in 1950.

There are two small villages located within the district boundaries, *viz*, Egypt Mills and Dutchtown. These two villages consist of a few residences and one or two stores. Both villages are unincorporated and the district maintains the non-state roads that pass through them.

Southeast Missouri State College is located in the City of Cape Girardeau with an annual enrollment of 2,100 students.

ORGANIZATION

The governing body of the Road District is the Board of Commissioners, consisting of three members all of whom must be resident tax payers of the district. The commissioners are appointed by joint action of the city council of the City of Cape Girardeau and the county court of Cape Girardeau County. Terms of the commissioners are staggered so that a new member of the board is appointed each year. Each commissioner is appointed for a term of three years, and in accordance with Missouri law receives no compensation.

The Board of Commissioners has sole, exclusive, and entire control of all public roads, except state roads within the boundaries of the district and outside the corporate limits of any city or village. The board has the power to maintain and construct roads and bridges and to plant and cultivate ornamental and shade trees along the sides of roads within the district.

The board appoints the engineer who directs all road and bridge work under policies established by the commissioners. The engineer is responsible for the employment of an overseer or foreman and approximately 12 laborers

and equipment operators (Fig. 3 is the organization chart of the district).

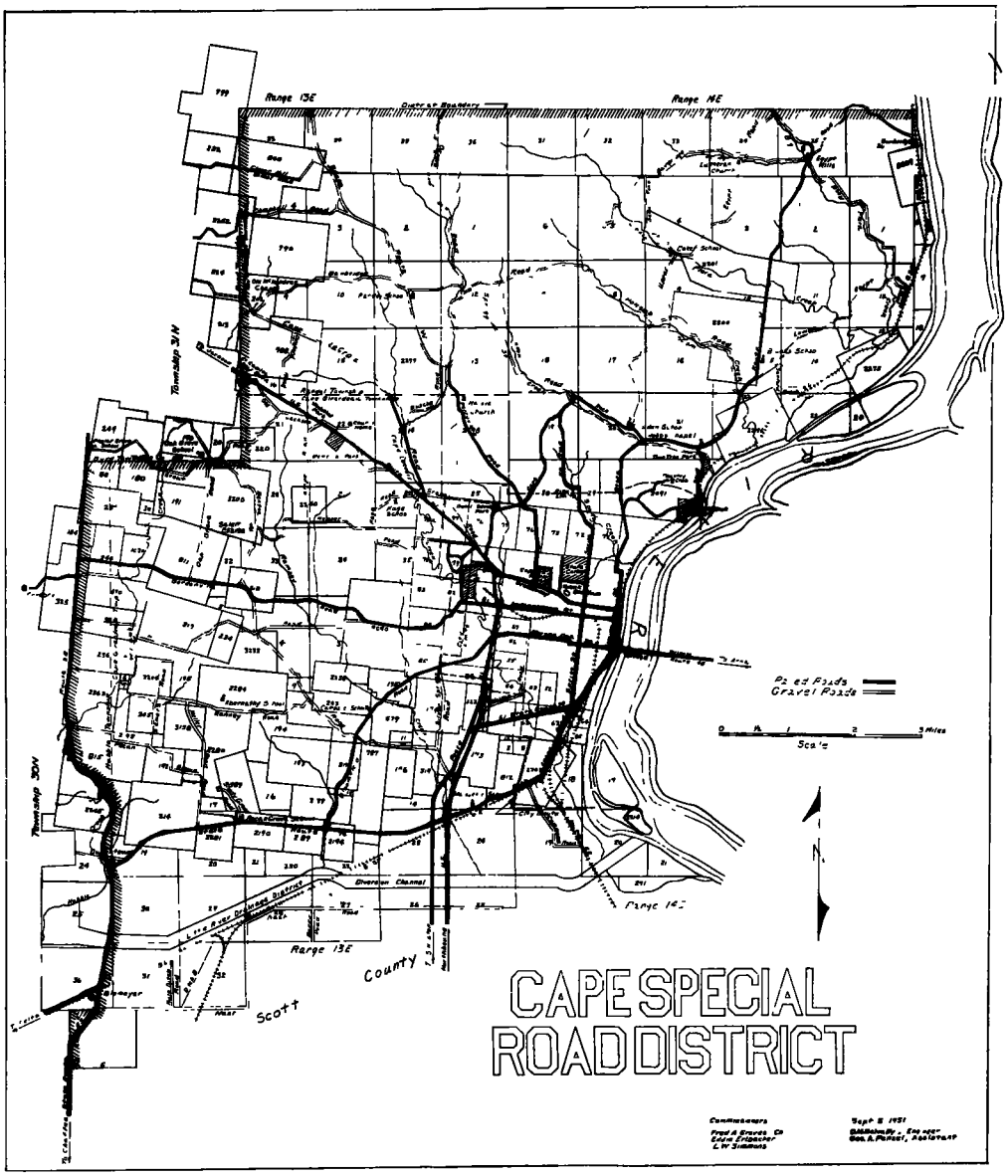

Figure 1. Map of Cape Special Road District.

In 1946, when the road district acquired the Mississippi River Toll Bridge at Cape Girardeau, there was employed on the toll bridge pay roll an assistant engineer and bridge superintendent. The road department and toll bridge department are two entirely separate operations, completely apart with the exception of the assistant engineer who works under the direction of the commissioners in matters pertaining to the toll bridge and under the engineer in matters pertaining to roads and bridges.

It is worth while at this time to point out that one past commissioner served on the board for over 20 years and the present chairman of the board is rounding out his twentieth year as a commissioner. The engineer has served either in a full time or in a consulting capacity since the organization of the district in 1912. The present overseer has been regularly employed since the organization, having started as a laborer when 16 years old and several equipment operators have been employed from 15 to 20 years. Although attorneys are not regularly retained, the same law firm has handled legal matters for over 25 years.

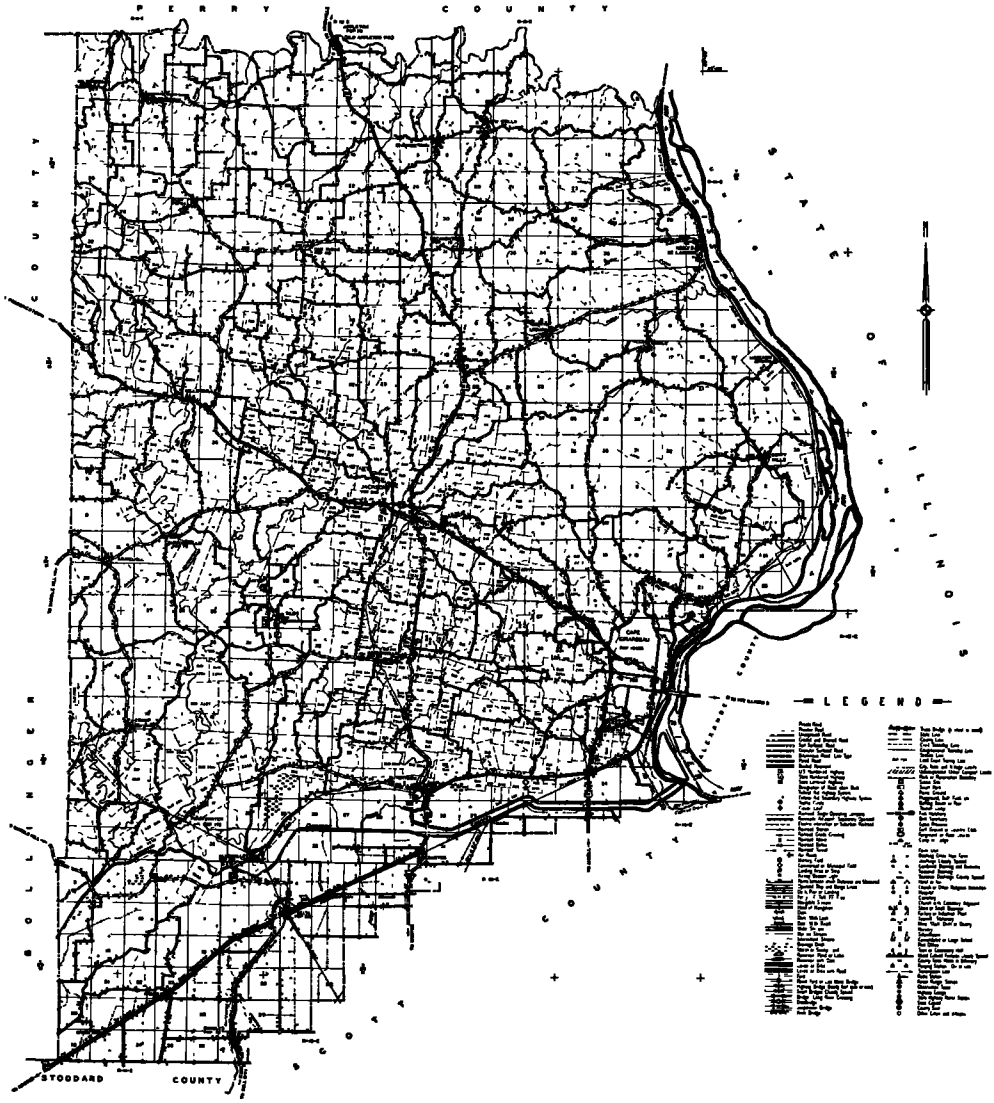

Figure 2. General highway map of Cape Girardeau County, Missouri.

The long length of service of the officers and employees has definitely contributed to the development of the road net within the district.

The present equipment owned and operated

is listed in the appendix. In early days road work was done with teams, wagons and scrapers, but since 1926, with the widespread use of the automobile and the increasing maintenance and construction activities, the district has acquired mechanical equipment. Regularly employed equipment operators make major and minor repairs of the equipment in the winter months, and also during the construction season when time permits.

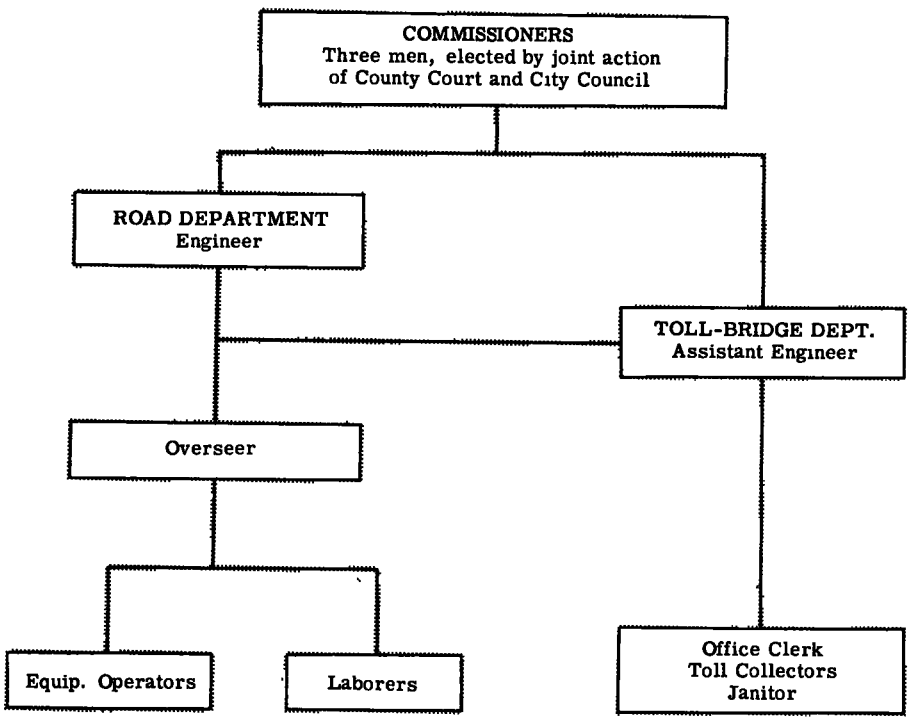

Figure 3. Organization chart of the Cape Special Road District.

In 1949 the district erected, with its own forces on its own lot, an aluminum Butler building, size 40 by 100 ft., to be used as a work shop and garage. The cost of this structure was $6,211. This has proven to be a very worthwhile investment, giving ample space to store equipment and make repairs.

FINANCING

Road maintenance and construction are financed by a road-and-bridge tax levied by the county court on all property, both real and personal, located within the district boundaries and including property within the city limits of Cape Girardeau. Collection of taxes is done by the county collector and the receipts are turned over by the county treasurer to the road district commissioners upon application. Also, the road district receives one fourth of all pool and billiard taxes paid within the city limits. However, this amounts to less than $75 per year. Up to the passage of the Volstead Act the district received one fourth of all saloon licenses which amounted to approximately $2,000 per year. Also, a poll tax of $4 per able-bodied male between the ages of 21 and 60 years residing outside the city limits of Cape Girardeau was collected prior to 1937.

Missouri law limits the levy by the county court for road and bridge purposes to a rate of 35 cents per $100 of assessed valuation. By submitting to the voters a proposal to

increase the rate, a maximum of 70 cents may be levied, providing such proposal is carried. However, at no time has the levy for road and bridge purposes on property within the Cape Special Road District been more than 35 cents. Figure 4 lists the tax receipts for the years 1913 to 1950, inclusive.

From 1913 to June 30, 1946, the county treasurer turned over to the commissioners all road-and-bridge taxes paid upon property located within the district. Effective July 1, 1946, in accordance with legislation enacted by the General Assembly of Missouri, 20 percent of all road-and-bridge taxes paid upon property located within the boundaries of a special road district are retained by the county and are expended by the county court on roads and bridges outside of the road district. Consequently the Cape Special Road District receives at this time only 80 percent of road and bridge taxes arising from property within its boundaries.

The Sixty-third General Assembly enacted House Bill 214, as amended by House Bill 1039, which is referred to as the "King Bill." This legislation was to create a County Aid Road Fund for the improvement, construction, reconstruction and restoration of county roads. Funds apportioned to the several counties of the state are based as follows: One half on the ratio that the county-road mileage of each county bears to the county-road mileage of the entire state, and one half on the ratio that the rural land valuation bears to the rural land valuation of the entire state. Under the King Bill, Cape Girardeau County has been allotted between 14 and 15 thousand dollars annually since the beginning of the fiscal year 1947.

The King Bill is to operate for a 5-year period from July 1, 1947 with administration

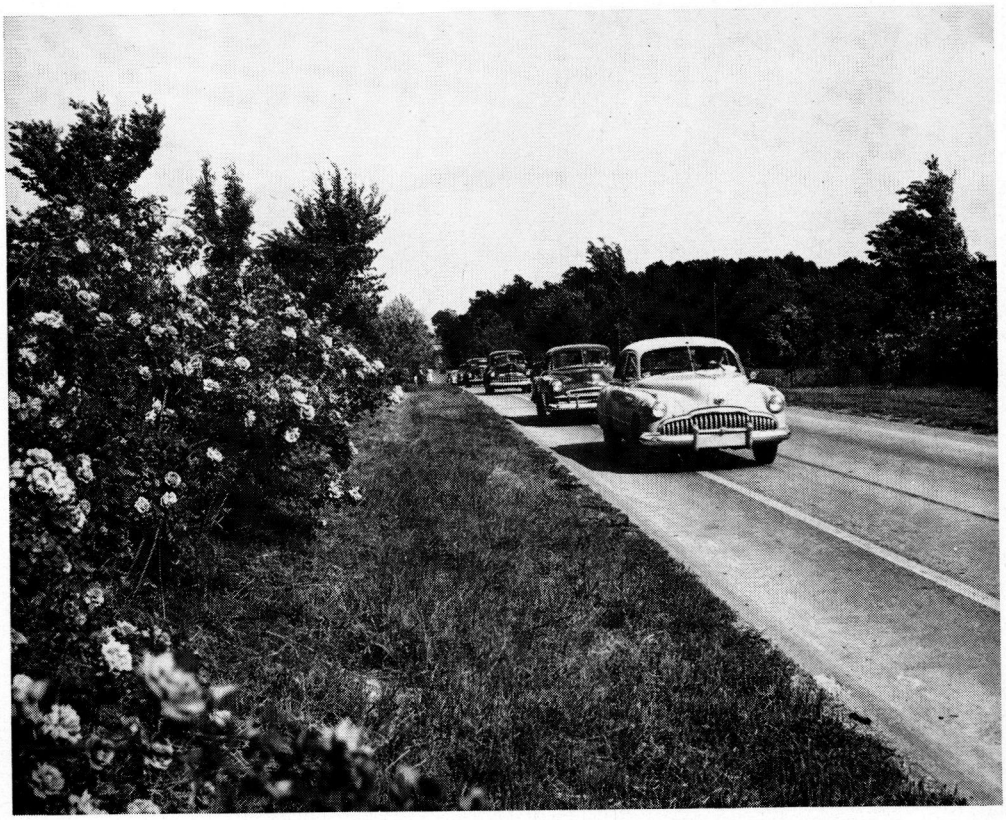

Figure 4. Scene along Ten-Mile Garden on US 61.

under the general supervision of the Missouri State Highway Department, which provides certain standards and specifications lower than those required for Missouri "farm-to-market roads" and highways. Projects must be approved and inspected by the state highway department. The King Bill limits state participation in a project to one half of the final cost, or one half of the engineers estimate, or $750 per mi., whichever is the lowest.

Upon the allocation of funds to the County of Cape Girardeau, the Cape Special Road District advised the county court that the road district would not make application for any portion of these funds provided that the county could use up their apportioned share. However, the county court granted the road district the right to make application for a part of the Cape Girardeau County allocation and Table 1 indicates the King Bill funds received by the district.

The Cape Special Road District believes that the King Bill is a valuable aid to the rural road program of the state. Legislation is now being considered by the Sixty-sixth General Assembly to increase state participation to a maximum of $1,000 per mi. and to share maintenance costs for completed King Bill projects to a maximum of $100 per yr per mi.

Section 8683, Article 10, Chapter 46, of Laws of Missouri Relating to Roads, Highways and Bridges provides that commissioners of special road districts may expend one fourth of their revenue arising from taxes for the purpose of road and bridge construction within the city limits of any corporate city within the boundaries of the road district.

Under the provisions of this section, the Cape Special Road District has contributed to projects within the city limits of Cape Girardeau a total of $167,132 since 1920. Selection and plans for projects are worked out jointly by the city engineer and the road district's engineer. At present every street leading into the city is paved and the road district has participated in each project.

Also the law provides that the district may carry on work outside of its boundaries, but not in another county. Up to January 1, 1950, there had been expended a total of $54,174 for road and bridge construction outside of the district's boundaries.

Throughout the years the road district has furnished funds for assisting the Missouri State Highway Department in the purchase of right-of-way for state and federal routes through the district and county. Table 2 shows the year and the amount expended for right-of-way for state and federal routes.

In 1928, $18,807.30 was contributed to the cost of widening the right-of-way of US 61. When the plans were made by the state for the construction of US 61 through the district, right-of-way with a maximum width of 125 ft. was specified. In view of future development, the commissioners insisted that additional right-of-way be secured and contributed the amount as listed above to widen bridges, lengthen culverts and to secure right-of-way varying from 125 to 270 ft. in width. This has proven to be a wise investment, because it provided room for extensive roadside planting and beautification.

TABLE 1

Year	Road Mileage Improved	Total Cost	State Funds Granted Road District
1948	13.61	$35,924 14	$10,181.75
1949	4 90	12,711.97	2,753.94
1950	18.30	20,227.77	8,079.74
1951	8.40	14,447 01	6,300 00

TABLE

Year	Route	Amount of Road District Participation
1926	State Highway No 25	$870 00
1928	U. S Highway No 61	38,496.27
1928	U. S Highway No 61	18,807 30 (Widening)
1929	State Highway No 74	12,479.43
1930	State Highway No. 55	2,292.54
1933	State Highway "V"	1,933.75
1934	State Highway "V"	239 32
1938	State Highway "V"	207 80
1940	State Highway No. 34	906.75
1940	State Highway No 25	750 00
1949	State Highway "W"	2,000 00
1950	State Highway No. 74	7,408.27

The Cape Special Road District has no bonded indebtedness obligating funds arising from the collection of taxes on property. Complete records are kept by the engineer on all expenditures, which show the amount spent on each project, either maintenance or new construction. An annual report prepared by the district treasurer, audited by an independent accountant and certified to by the officers of the board is filed with the Missouri State Highway Department and the county court.

MAINTENANCE AND CONSTRUCTION

The operation of the Cape Special Road District is small; however, the operation is complete with employees and district-owned equipment capable of carrying out all types of road and bridge construction.

All roads within the district are surfaced either with gravel surface, oil mat, or portland-cement-concrete pavement. The present road mileage of the district is 122.5 mi., not including 30.85 mi. of paved state roads. Of the district mileage, 25 mi. are oil mat and 3¼ mi. are portland-cement-concrete pavement.

Gravel surfacing of roads is done with crushed gravel, creek-run gravel, or material from an open-pit silica mine located south centrally in the district. The material from this open-pit mine is composed of amorphous silica, flint, and chert, combined with some chalk, which makes an excellent road metal, and the supply is unlimited. Creek-run gravel is found in abundance in the northern half of the district and is accessible throughout the entire year. Crushed gravel is always available from a local gravel contractor.

The cost of mining and loading silica in dump trucks ready for hauling runs approximately 35 cents per cu. yd. Crushed gravel is $1 per cu. yd. loaded in trucks, or 90 cents when loaded by district-owned equipment. The cost of loading creek-run gravel runs about 12 cents per cu. yd. More creek-run gravel is used both for new construction and maintenance than any other type of road material, because of economy. However, the oversize in this type is a problem. Where there is considerable oversize, it is bladed to one side of the road and picked up during bad weather when other work can not be carried on. There are a few places where creek-run gravel is found with hardly any oversize, and, of course, these bars are utilized to the maximum. For a newly constructed road there is applied in the neighborhood of 15 to 20 cu. yd. per station. Quantity of application for maintenance varies considerably, depending on the condition of the surface at the time of application. Motor patrols are used on all gravel roads throughout the year.

When funds become available for higher-type surfacing, selection of projects is based on traffic counts. Traffic counts are not conducted regularly, but only when the need for this data is required.

The specifications for constructing oil mat, or portland-cement-concrete pavement follow those in use by the Missouri State Highway Department.

Seal coating of oil mat roads is carried on each summer after a careful inspection is made to determine where there is a need for such work.

It is fortunate that there is a large quarry in Cape Girardeau that produces crushed stone for all types of oil mat and concrete work. This crushed rock is produced to meet state-highway specifications and gives excellent results.

Prior to the enlargement of the district in there were only two small wooden culverts remaining in the district, but with the increase in size, many wooden structures of all kinds were inherited.

Bridge and culvert replacement goes on continually, when funds are available or when an old wooden structure gets beyond repair. Extensive use has been made of junked boilers, which are bought at scrap-iron prices from local scrap-iron yards. These old boilers with the ends out make excellent pipe culverts and many are still in use after thrity-five years of service. Headwalls are constructed on boilers 30 in. in diameter, or larger.

On higher-type surfaced roads, drainage structures are patterned after those used by the state highway department in its "Farm to Market" system. Where openings larger than 30-in. pipe are necessary and no boiler is available, a reinforced-concrete box culvert or a bridge is erected. Bridges erected on main-line roads are steel stringers on concrete or treated-timber bents with a 20-ft. concrete deck. On roads with less traffic a wood floor is sometimes used instead of concrete, depending on funds available and the traffic count, but in all cases treated-timber or concrete bents and abutments are used.

There are in use several pony-truss bridges with wooden floors resting on concrete or rock-masonry abutments. The roadway on this type is only 12 ft., but all have been replaced on the main-line roads. When a bridge like this is taken down it is repaired, repainted, and erected in the place of a wooden structure on a road of low traffic count.

All maintenance work of the district and the greater part of the construction is carried on by regularly employed personnel, while

the balance of the construction is done on a contract basis.

ROADSIDE PLANTING AND PARKS

In 1931 the road district, in conjunction with the state highway department, began the development of the Ten-Mile Garden, which is on the right-of-way of US 61 between Cape Girardeau and Jackson. This development has received the support of many service and garden clubs in Jackson and Cape Girardeau and several local individual citizens.

The Ten-Mile Garden is considered to be the most extensive roadside development in the Midwest. Plantings include 1,317 evergreens, 9,960 roses, and approximately 14,000 other varieties all on a right-of-way 125 to 270 ft. in width for a distance of 10 miles.

Ovens and tables are located in two small parks along the right-of-way and are used extensively by tourists and local citizens for recreation.

Since 1939 the road district has not participated in the Ten-Mile Garden to any extent, with the work being carried on by the state highway department in a splendid manner.

In May 1931, the district began the development of Cape Rock Drive, which winds through the river hills and along the Mississippi just north of the city. Along the 7.63 mi. of Cape Rock Drive, over 5,000 plantings of all varieties have been set out. These plantings with the native trees on a right-of-way varying from 60 to 100 ft. make a pleasant drive for local citizens and tourists. All of the drive has an oil-mat surface.

Adjacent to the drive the district maintains three parks with ovens and tables for picnics

Figure 5. Cape Rock in Cape Rock Park.

and outings. Locations of the parks were selected for their natural beauty, and in each there are many large native trees.

Dennis Scivally Park, 6 acres in size, and Twin-Trees Park, 13 acres in size, are the property of the road district, while Cape Rock Park, 27 acres in size, is the property of a group of business and professional men in the city who purchased it for the free use of the citizens of the community. Cape Rock Park includes Cape Rock, a large promontory on the Mississippi River where Ensign Girardot established a trading post early in the Eighteenth Century.

Many people from all over Missouri and neighboring states visit Cape Girardeau during the summer months to view the Ten-Mile Garden and Cape Rock Drive. School groups and others from a radius of 50 mi. come to the parks for picnics and all day outings. The commissioners of the road district are convinced that the roadside planting and park program is a definite contribution to the welfare of the community.

Scenes along the Ten-Mile Garden and Cape Rock Drive are shown in Figures 5 and 6.

Figure 6. Entrance to Dennis Scivally Park.

TOLL-BRIDGE OPERATION

In 1946, when it became apparent to the commissioners of the Cape Special Road District that the toll bridge across the Mississippi River at Cape Girardeau was to be sold by private capital to a political subdivision, either of Illinois or Missouri, it was decided by the commissioners to issue revenue bonds and purchase the bridge with the long-range view of making it toll free, or at a much reduced fare after the bonds are retired.

Revenue bonds in the amount of $2,370,000, pledging toll revenue only and with the precise

stipulation that these bonds would never be a liability or an obligation on the part of tax funds arising from property, were issued. On June 8, 1946, the road district began the operation of the Cape Toll Bridge.

TABLE 3

Year	Revenue	Traffic Count	Bond Retirements
1946 (6/8 to 12/31)	$160,110	334,961	
1947	272,041	546,385	
1948	302,582	613,117	$125,000
1949	320,436	646,166	165,000
1950	332,006	660,622	240,000
1951 (to 8/31)	226,919	449,061	85,000
Present bonds outstanding			$1,755,000
Expected to retire December 1, 1951			115,000

TABLE 4

LIST OF TAX RECEIPTS, RATES AND ASSESSED VALUATION

Year	Road & Bridge Tax Rate per $100 Assessed Valuation	Road District Tax Receipts	Assessed Valuation of Road District	Assessed Valuation of Cape Girardeau County
1913		$7,953 37		
1914		7,839 77		
1915		10,183.46		
1916		9,518.60		
1917		14,205.62		
1918		21,079.16		
1919		25,857.20		
1920		26,484.76		
1921	0.22	25,024.93		
1922	0.22	26,841.45		
1923	0.225	28,413.92		
1924	0.25	30,860.60		
1925	0.35	42,487 56		
1926	0.30	39,826 73		
1927	0.28	36,994.92		
1928	0 30	39,459 91		
1929	0.30	39,666 46		
1930	0.30	42,460.85		
1931	0.27	36,105.41		
1932	0.24	29,414.50		
1933	0.24	31,598 80		$24,758,950
1934	0.24	28,232 07		24,099,002
1935	0.24	29,566 47		23,751,530
1936	0.24	26,766.41		23,947,010
1937	0.24	28,662 14		21,412,437
1938	0.29	31,534 54		24,345,813
1939	0 29	39,850 44		24,380,311
1940	0 29	40,064.05		24,672,769
1941	0.29	42,414 38		25,112,884
1942	0.29	44,106.00		25,900,057
1943	0.29	46,679.40		26,464,301
1944	0 29	43,390.35		26,709,266
1945	0.28	42,240.72		27,135,863
1946	0 30	39,239.11		27,022,185
1947	0.35	37,462.25		28,219,206
1948	0.35	50,905.69	$17,594,736	30,628,741
1949	0.35	53,821.27	19,783,568	32,495,098
1950	0.35	59,308 33	20,732,333	34,359,429

Interest rates on the original issue were $3\frac{1}{2}$ percent to begin with and were reduced to $2\frac{3}{4}$ percent by June 1, 1950, when the original issue was retired by issuing a new series with approximately one half of the bonds bearing an interest rate of $2\frac{1}{4}$ percent and the other half $2\frac{1}{8}$ percent.

Table 3 illustrates the yearly revenues arising from the toll bridge, the traffic count, and the bond retirements since the road district acquired the bridge.

The toll bridge is a steel and reinforced-concrete structure with an overall length of 3,685 ft., carrying a 20-ft. roadway with an Illinois approach of 1,029 ft. The truss-spans rest on eight concrete piers and the east abutment. The bridge was designed by Harrington, Howard, and Ash, Consulting Engineers, Kansas City, Missouri, and erected under their supervision. The bridge was opened to traffic September 3, 1928. The original cost of the structure was $1,600,000 and was built under an act of Congress, Public Act 172, Sixty-ninth Congress, House Resolution 10164, approved May 3, 1926. The bridge serves US 61 and State Routes 74 and 34 in Missouri, and State Routes 3 and 146 in Illinois.

The commissioners expect to have all revenue bonds retired by December 1, 1958.

The toll-bridge department operates completely apart from the road department, with separate accounts and separate books of record and with a monthly and annual audit by certified public accountants. Copies of the annual report are furnished the highway departments of Missouri and Illinois and the bond holders.

CONCLUSION

It has been the purpose of this paper to show the development and operation of a road district organized and operated under the laws of the State of Missouri. The citizens of this community are of the opinion that road-district organization is one successful solution to the rural road problem.

To properly conclude this report some mention must be made of the present commissioners and the engineer. The present chairman of the board, Fred A. Groves, has served continuously as a commissioner since February 1932. Eddie Erlbacher, treasurer, was appointed in November 1949, and L. W. Simmons, clerk, was appointed in February 1951. All commissioners are civic-minded businessmen and, realizing the necessity for a planned road program in the community, give much of their time and efforts toward the betterment of the road net within the county.

Dennis M. Scivally has served as the district engineer since organization in 1912. Until

1930 Scivally, while regularly employed as county highway engineer or as a project engineer for the state highway department, served in a consulting capacity. In 1930 he went on a full-time basis with the district and continues in that capacity today.

APPENDIX

List of Equipment and Date Acquired

3——5 Cu. Yd. 2½-Ton Dump Trucks, (1947, 1948, 1950)
1——D7 Caterpillar Tractor with Dozer, (1946)
2——½-Ton Pick-up Trucks, (1937, 1948)
1——Fordson Tractor with mower attachment, (1947)
1——600-gallon road oil distributor mounted on 1½-Ton LWB Trunk, (1935)
1——Roller 4 Ton Fordson modified
1——Motor Patrol Caterpillar No. 11, (1938)
1——Motor Patrol Caterpillar No 112, (1950)
1——Front end loader (High Lift) mounted on rubber tires, capacity ¾ Cu. Yds., (1950)
1——Shovel, ½ Cu. Yd. capacity, (1940)
1——12,000-gallon Road Oil Storage Tank, (1948)
1——Scarifier, (1920)
1——Fresno Tumbling Type
1——Air Compressor and Rock Drill
1——Well Drill, (1943)
4——Power mowers for park Maintenance

PERFORMANCE STUDY OF CALCIUM-CHLORIDE-TREATED ROADS

E. M. Baylard, *Superintendent of Highways, Onondaga County, New York*

●The Secondary Roads Committee of the Highway Research Board was formed in 1947 in response to an expressed need for information on maintenance of secondary or county roads. One of the first activities of this committee was to conduct a survey of county maintenance units. In addition to collecting information on county highway organization, the survey attempted to determine from the counties the problems of maintenance on which they desire special studies. The four subjects given most response were: (1) stabilized aggregate surfaces, (2) drainage and erosion, (3) maintenance of low cost roads, and (4) dust alleviation.

It was agreed that a performance study of stabilized gravel roads in Onondaga County would be of interest. The program as conducted was the result of a series of conferences with representatives from the Bureau of Public Roads in Washington and Albany, the Bureau of Soils Mechanics of the New York State Department of Public Works, the Calcium Chloride Institute, and the Solvay Process Division of Allied Chemical and Dye Corporation.

HISTORY OF THE GRAVEL ROADS

Beginning in 1932 with a 50-mi. road program, the Onondaga County Highway Department had constructed 435 miles of calcium-chloride-treated gravel roads by the close of the 1938 season. The program was designed to provide: work relief with a maximum expenditure of money for labor and a minimum for materials; good all-weather farm-to-market roads; and adequate bases for higher-type surface when traffic conditions warranted.

At the present time, approximately 325 mi. of these roads have been covered with a bituminous surface mat or a gravel-tar mulch, leaving about 110 mi. still being maintained as calcium-chloride-treated gravel surfaces.

A detailed description of the materials and method of construction was reported by R. B. Traver and W. B. Hicks in the Proceedings of the Thirteenth Annual Meeting of the Highway Research Board, December 1933. For the purpose of this report it is necessary only to mention details which were factors in this gravel loss investigation.

Most important of these details is the fact that a standard road design was adopted, with a cross-section as illustrated in Figure 1. The actual construction consisted in clearing and grubbing work; the laying of permanent, ample culverts; and ditching and grading, using material from the ditches in building the subgrade. The grading was completed by blading and rolling to form a smooth, flat subgrade from ditch to ditch.

Bank-run gravel was spread on the subgrade, large stones removed by raking, and the surface shaped by blading, followed by rolling and honing. The quantity of gravel and shaping of the surface was guided by stakes to give a 9-in. depth at the center line, a six-in. depth 5 ft. either side of the center, and feathering out at 10 ft. This resulted in a partially compacted surface representing 1711 cu. yd. of gravel per mi., with an average depth for the 20-ft. width of 5.25 in. After